

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of

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HUEFFER et al.

)

Art Unit: 1713

Serial No. 09/041,698

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Examiner: Lu, C.

Filed: March 13, 1998

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For: **HIGHLY CRYSTALLINE PROPYLENE HOMOPOLYMERS**

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BRIEF ON APPEAL

Sir:

This is an appeal from the examiner's Final Rejection of May 4, 2000.

(1) REAL PARTY IN INTEREST

The real party in interest in BASF Aktiengesellschaft of Ludwigshafen, Germany.

(2) RELATED APPEALS AND INTERFERENCES

To the best of the undersigned's knowledge, there are no related appeals or
interferences within the meaning of 37 CFR 1.192(c).

(3) STATUS OF CLAIMS

This appeal is directed to claims 3-12 and 14, all the pending claims. Claims 1,
2 and 13 have been canceled. A copy of appealed claims 3-12 and 14 is appended

hereto pursuant to 37 CFR 1.192(c)(9).

(4) STATUS OF AMENDMENTS

Applicants filed an amendment after the final rejection canceling claims 1, 2 and 13. The examiner's advisory action mailed October 26, 2000 (Paper No. 8) indicated that the amendment would be entered upon filing a Notice of Appeal and an Appeal Brief.

(5) SUMMARY OF INVENTION

The invention is directed to a process for the preparation of propylene homopolymers and to the propylene homopolymers produced by the process, which have a high content of polymer chains having long, perfectly isotactic polymer sequences, which is reflected in a higher melting point, a higher crystallization rate and a higher material rigidity (page 2, lines 30-35). According to applicants' process, propylene is polymerized in the presence of a Ziegler-Natta catalyst system containing, as the active components, a titanium-containing solid component a) which is obtained by reacting a titanium halide with a compound of magnesium, an inorganic oxide as a carrier, a C₁-C₈-alkanol and an electron donor compound, and, as cocatalysts, an aluminum compound b) and a further electron donor compound c) (page 4, lines 12-19). An important feature of applicants' process is the use of a chlorine-free compound of magnesium in the preparation of the titanium-containing solid component (page 4, lines 37-44).

The titanium-containing solid component a) is prepared in a two-stage process. In the first stage a solution of a chlorine-free compound of magnesium is first added to the inorganic oxide in an inert solvent and the mixture is allowed to react. Thereafter, the C1-C8-alkanol is added in at least a 1.3-fold, molar excess and reacted to give a chlorine-free intermediate. The titanium halide and the electron donor compound are then added to the intermediate and the mixture is allowed to react to form a solid substance. In the second stage, the solid substance obtained in the first stage is extracted with titanium tetrachloride, and the product is then washed with a liquid alkane (page 8, line 16 to page 9, line 5).

(6) THE ISSUES

There are two issues presented for decision by the Board of Appeals and Interferences:

- (1) Are claims 3-11 obvious within the meaning of 35 USC 103(a) over Shinosaki et al. (JP 07-025946, translated copy) or Noristi et al. (US 5,244,854)?
- (2) Are claims 12 and 14 anticipated within the meaning of 35 USC 102(b) or obvious within the meaning of 35 USC 103(a) over Shinosaki et al., Noristi et al., Ebara et al. (EP 0 657 477 A2) or Yanagihara et al. (EP 0 712 869 A1)?

(7) GROUPING OF CLAIMS

For the purposes of this appeal, the claims in group (1), claims 3-11, may be considered to stand or fall together. Similarly, the claims in group (2), claims 12 and

14, may be considered to stand or fall together.

(8) ARGUMENT

Issue (1)

The examiner has not established a *prima facie* case of obviousness. Noristi et al. (Noristi) neither discloses nor suggests applicants' process for preparing propylene homopolymers as set forth in claim 3, nor does Shinosaki et al. (Shinosaki).

Applicants' claim 3 requires a specific two-stage process for preparing the titanium-containing solid component a). Claim 3 requires in the first stage that a solution of a chlorine-free compound of magnesium in an inert solvent is added to the inorganic oxide carrier and the mixture is allowed to react for 0.5 to 5 hours, and then reacted with a C1-C8-alkanol in a 1.3 molar excess to give a chlorine-free intermediate. Then the titanium halide and the electron donor compound are added to the intermediate, and the mixture is allowed to react. In the second stage, the solid obtained in the first stage is extracted in an inert solvent containing at least 5% by weight of titanium tetrachloride and washed with a liquid alkane.

Noristi fails to teach that, in the first stage, a chlorine-free compound of magnesium in an inert solvent is added to the inorganic oxide carrier, such mixture is allowed to react and afterwards the reaction mixture is reacted with a C₁-C₈ alcohol. Noristi clearly recommends reacting a magnesium halide and not a magnesium alkyl component with titanium tetrachloride (see column 5, lines 7-12). Applicants' claims

require a chlorine-free compound of magnesium, and the claims embrace magnesium alkyl components (see claim 6 and page 4, line 44 to page 5, line 12 of the specification). It is noted that the examiner has cited column 4, lines 55-56 of Noristi which teaches the "magnesium halides are dissolved in solvents such as alcohols". This citation overlooks the specific requirement in applicants' claim 3 for a "chlorine-free compound of magnesium".

Further, Noristi fails to teach or suggest the requirement in claim 3 that in the second stage the solid is extracted in an inert solvent containing at least 5% by weight of titanium tetrachloride and washed with a liquid alkane. The examiner acknowledged in the final rejection, paragraph bridging pages 3 and 4, that there is no teaching in Noristi of the extraction step with at least 5% titanium chloride. Notwithstanding the total absence of any teaching or suggestion in the prior art of the claimed extraction step, the examiner urged that "it would have been obvious ... unless there is a showing of criticalities and unexpected results." The examiner's position puts the cart before the horse and is clearly erroneous. The examiner has not established a *prima facie* case of obviousness, and, in the total absence of a *prima facie* case of obviousness, a showing of criticality or unexpected results is unnecessary and would be superfluous. The examiner has the burden to establish a *prima facie* case of obviousness in the first instance. *Ex parte Obukowicz*, 27 USPQ2d 1063 (Bd. Pat. App. & Int. 1992).

Shinosaki also fails to teach or suggest that, in the first stage a chlorine-free

compound of magnesium is added to the inorganic carrier, such mixture is allowed to react and afterwards the reaction mixture is reacted with a C₁-C₈-alcohol. Nor does Shinosaki teach or suggest the second stage extraction in an inert solvent containing at least 5% of titanium tetrachloride. Similarly to Noristi, Shinosaki also refers to a process for producing the titanium containing solid component by reacting a magnesium halide and not a magnesium alkyl compound with TiCl₄ (see Working Examples 1-5, according to which a magnesium halide is reacted with an alcohol). On page 20, third paragraph [0062], Shinosaki teaches that "halogen-containing magnesium compounds are preferred", thereby teaching away from applicants' claimed invention which requires in claim 3 that a "chlorine-free compound of magnesium" be reacted with the inorganic oxide carrier.

Issue (2)

With regard to the product-by-process claims 12 and 14, the examiner has failed to make out a *prima facie* case that the product of the references "reasonably" appears to be identical to or only slightly different than the claimed products-by-process. In re Brown, 173 USPQ 685, 688 (CCPA 1972). As pointed out on page 2 and 3 of the specification, the homopolymers obtained with applicants' process are distinguished by a high content of polymer chains having long, perfectly isotactic polymer sequences. Further, they satisfy one, two or all of the following TREF conditions:

- i) The fraction which remains undissolved on heating the cooled propylene

homopolymer solution to 112°C is greater than 20 %by weight.

ii) The fraction which remains undissolved on heating the cooled propylene homopolymer solution to 117° C is greater than 8 % by weight.

iii) The fraction which remains undissolved on heating the cooled propylene homopolymer solution to 122°C is greater than 1% by weight.

These conditions describe a particular profile of a type not hinted at by the references, i.e., the entire concept is lacking from the prior art references.

CONCLUSION

For all of the foregoing reasons, the examiner's rejections should be reversed.

Please charge any shortage in fees due in connection with the filing of this paper, including Extension of Time fees to Deposit Account No. 11-0345. Please credit any excess fees to such deposit account.

Respectfully submitted,

KEIL & WEINKAUF



Ronald H. Smith
Reg. No. 43679

1101 Connecticut Ave., N.W.
Washington, D.C. 20036
(202)659-0100

RHS/kas

APPENDIX

3. A process for the preparation of propylene homopolymers by polymerizing propylene at from 20 to 150°C and from 1 to 100 bar in the presence of a Ziegler-Natta catalyst system containing, as active components,

- a titanium-containing solid component which is obtained by reacting a titanium halide with a chlorine-free compound of magnesium, an inorganic oxide as a carrier, a C₁-C₈-alkanol and an electron donor compound by a method in which, in a first stage, a solution of the chlorine-free compound of magnesium in an inert solvent is added to the inorganic oxide as a carrier, this mixture is allowed to react for from 0.5 to 5 hours at from 10 to 120°C and then reacted, at from -20 to 80°C with constant mixing, with a C₁-C₈-alkanol in at least a 1.3 fold molar excess, based on the compound of magnesium, to give a chlorine-free intermediate, the titanium halide and the electron donor compound are then added to said intermediate, the resulting mixture is allowed to react for at least 10 minutes at from 10 to 150°C and the solid substance thus obtained is then filtered off as washed and in a second stage, the solid obtained from the first stage is extracted in an inert solvent containing at least 5% by weight of titanium tetrachloride and is washed with a liquid alkane, and, as cocatalysts,
- an aluminum compound and
- a further electron donor compound,

the molar ratio of the aluminum compound b) to the further electron donor

compound c) in the polymerization being from 1.5 : 1 to 9 :1.

4. A process for the preparation of propylene homopolymers as claimed in claim 3, wherein the molar ratio of the aluminum compound b) to the further electron donor compound c) is from 2 : 1 to 8 :1.
5. A process for the preparation of propylene homopolymers as claimed in claim 3, wherein ethanol is used as a C₁-C₈-alkanol in the preparation of the titanium-containing solid component a) in the first stage.
6. A process for the preparation of propylene homopolymers as claimed in claim 3, wherein a di-C₁-C₁₀-alkylmagnesium is used as the chlorine-free compound of magnesium in the preparation of the titanium-containing solid component a).
7. A process for the preparation of propylene homopolymers as claimed in claim 3, wherein an inorganic oxide which has a pH of from 1 to 6.5, a mean particle diameter of from 5 to 200 µm and cavities or channels having a mean diameter of from 1 to 20 µm and whose macroscopic volume fraction, based on the total particle, is from 5 to 30% is used as a carrier in the preparation of the titanium-containing solid component a).
8. A process for the preparation of propylene homopolymers as claimed in claim 3, wherein silica gel is used as the inorganic oxide in the preparation of the titanium-containing solid component a).
9. A process for the preparation of propylene homopolymers as claimed in claim 3, wherein silica gel is used as the inorganic oxide in the preparation of the titanium-containing solid component a).
10. A process for the preparation of propylene homopolymers as claimed in claim 3, wherein a trialkylaluminum compound whose alkyl groups are each of 1 to 8 carbon atoms is used as the aluminum compound b).
11. A process for the preparation of propylene homopolymers as claimed as claim 3, wherein at least one organosilicon compound of the formula (I)



where the radicals R¹ are identical or different as are each C₁-C₂₀-alkyl, 5- to 7-membered cycloalkyl, which in turn may be substituted by C₁-C₁₀-alkyl, or are C₆-

C_{28} -aryl or C_6 - C_{18} -aryl- C_1 - C_{10} -alkyl, the radicals R^2 are identical or different and are each C_1 - C_{20} -alkyl and in is 1, 2, or 3, is used as the further electron donor compound c).

12. A propylene homopolymer obtainable by a process as claimed in claim 3.
14. A film, fiber or molding comprising the propylene homopolymer as claimed in claim 12.